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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,854	11/19/2001	John Teloh	SMQ-082CN2/P6396CNT1	9383
959	7590	07/01/2005	EXAMINER	
LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			ABEL JALIL, NEVEEN	
			ART UNIT	PAPER NUMBER
			2165	

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/988,854

Applicant(s)

TELOH ET AL.

Examiner

Neveen Abel-Jalil

Art Unit

2165

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-22, and 24-31 is/are rejected.
- 7) ☒ Claim(s) 5 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### Remarks

1. The Amendment filed on April 5, 2005 has been received and entered. Claims 1-31 are now pending.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-22, and 24-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Debique et al. (U.S. Patent No. 5,613,079) in view of Sicola et al. (U.S. Patent No. 6,658,590 B1).

As to claims 1, 19, and 31, Debique et al. discloses in a storage network, a method to update a first replica held by a physically remote storage device in said storage network, said method comprising the steps of:

instructing a first data replication facility of a first electronic device in said storage network to log one or more writes to a local storage device when said first replica held by said physically remote storage device cannot be updated due to a detected error condition in the storage network (See Debique et al. column 7, lines 31-57, also see Debique et al. column 6, lines 33-51);

determining at said first electronic device if said detected error condition still exists in the storage network that prevents updating of said first replica held by said physically remote storage device (See Debique et al. column 7, lines 37-58);

instructing said first data replication facility of said first electronic device to replicate data corresponding to the one or more writes identified in said log to generate a second replica upon determination by said first electronic device that said first replica held by said physically remote storage device can be updated due to a removal of said detected error condition that prevents updating of said first replica held by said physically remote storage device (See Debique et al. column 3, lines 31-46, also see Debique et al. column 4, lines 12-63, and see Debique et al. column 7, lines 5-50); and

from said first electronic device to a second data replication facility of a second electronic device of said physically remote storage device in said storage network to update said first replica (See Debique et al. column 4, lines 12-40).

Debique et al. does not teach outputting said second replica in accordance with a communication protocol.

Sicola et al. outputting said second replica in accordance with a communication protocol (See Sicola column 3, lines 11-30, also see Sicola column 5, lines 8-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. to include outputting said second replica in accordance with a communication protocol.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. by the teaching of Sicola et al. to include outputting

said second replica in accordance with a communication protocol because it provides for transmission means in a remote networked database environment.

As to claims 2, and 20, Debique et al. as modified discloses further comprising the step of, identifying to said first data replication facility of said first electronic device which of said one or more writes to said local storage device should not be logged when said physically remote storage device cannot be updated (See Sicola et al. column 15, lines 28-38, also see Debique et al. column 11, lines 1-8, also see Debique et al. column 12, lines 1-6).

As to claims 3, and 21, Debique et al. as modified discloses further comprising the step of, instructing said first data replication facility of said first electronic device to automatically output said second replica to said second replication facility once generation of said second replica is complete (See Sicola et al. column 13, lines 40-61, also see Debique et al. column 7, lines 37-50).

As to claims 4, and 22, Debique et al. as modified discloses further comprising the step of, instructing said first replication facility of said first electronic device to prompt an operator of said first replication facility in order to obtain authorization for said output of said second data replica to said second data replication facility of said second electronic device to update said first replica (See Sicola et al. column 2, lines 5-23, prior art, also see Debique et al. column 7, lines 1-50).

As to claim 6, Debique et al. as modified discloses comprising the step of, instructing said second replication facility of said second electronic device to log said one or more writes to a second local storage device of said second electronic device (See Debique et al. column 6, lines 20-61).

As to claims 7, and 25, Debique et al. discloses further comprising the steps of:  
prompting said system operator to select a primary replication facility and a secondary replication facility from amongst said first replication facility of said first electronic device and said second replication facility of said second electronic device (See Debique et al. column 6, lines 18-61);

upon selection by said system operator, instructing said primary replication facility to generate said second replica of data identified in said log (See Debique et al. column 3, lines 31-46, also see Debique et al. column 4, lines 12-63, and see Debique et al. column 7, lines 5-50);  
and

instructing said primary replication facility to output said second replica for transmission to said secondary replication facility to update said first replica (See Debique et al. column 3, lines 31-46, also see Debique et al. column 4, lines 12-63, and see Debique et al. column 7, lines 5-50).

Debique et al. does not teach detecting an available communication link in said storage network between said first electronic device and said second electronic device to transport data between said first electronic device and said second electronic device; and  
via said available communication link.

Sicola et al. teaches detecting an available communication link in said storage network between said first electronic device and said second electronic device to transport data between said first electronic device and said second electronic device (See Sicola column 3, lines 11-30, also see Sicola column 5, lines 8-15); and

via said available communication link (See Sicola column 3, lines 11-30, also see Sicola column 5, lines 8-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. to include detecting an available communication link in said storage network between said first electronic device and said second electronic device to transport data between said first electronic device and said second electronic device; and via said available communication link.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. by the teaching of Sicola et al. to include detecting an available communication link in said storage network between said first electronic device and said second electronic device to transport data between said first electronic device and said second electronic device; and via said available communication link because it provides for transmission means in a remote networked database environment.

As to claims 8, 15, and 26, Debique et al. as modified discloses comprising the step of, forwarding from said first data replication facility of said first electronic device to said second data replication facility at said second electronic device information identifying a storage location on said physically remote storage device for storage of said second replica (See Debique

et al. column 8, lines 3-38).

As to claims 9, 16, and 27, Debique et al. as modified discloses wherein said outputting from said first data replication facility of said first electronic device to said second data replication facility of said second electronic device occurs in a synchronous manner (See Sicola et al. column 11, lines 5-47, also see Sicola column 6, lines 63-67).

As to claims 10, 17, and 28, Debique et al. as modified discloses wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (See Sicola et al. column 4, lines 23-31).

As to claims 11, 18, and 29, Debique et al. as modified discloses wherein said first electronic device and said second electronic device operate without a volume manager facility (See Debique et al. column 7, lines 65-67, and see Debique et al. column 8, lines 1-9).

As to claims 12, and 30, Debique et al. as modified discloses wherein said log comprises a bitmap holding one or more bits, pointers, wherein each of the one or more bits, pointers in the bit map indicates a storage location written to on the local storage device (See Sicola et al. column 16, lines 23-51).

As to claim 13, Debique et al. discloses in a computer network having a plurality of programmable electronic devices, wherein each of said plurality of programmable electronic



devices operates as a host device for a data replication facility for replicating data among said plurality of programmable electronic devices, said method comprising the steps of:

instructing each said data replication facility of each of said plurality of programmable electronic devices to enter a logging routine should said host device of said data replication facility, wherein said logging routine halts said replicating of data by said replication facility of said host device and said replication facility of said host device identifies in a log each local write of said host device (See Debique et al. column 3, lines 31-46, also see Debique et al. column 4, lines 12-63, and see Debique et al. column 7, lines 5-50); and

instructing each said data replication facility of each of said plurality of programmable electronic devices that initiated said logging routine to generate a replica for each said local write identified in said log upon reestablishment of said communication link (See Debique et al. column 6, lines 18-61).

Debique et al. does not teach detect said communication link failure.

Sicola et al. teaches detect said communication link failure (See Sicola column 3, lines 11-30, also see Sicola column 5, lines 8-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. to include detect said communication link failure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Debique et al. by the teaching of Sicola et al. to include detect said communication link failure because it provides for transmission means in a remote networked database environment.

As to claim 14, Debique et al. as modified discloses comprising the steps of, grouping each said replica into a single data set (See Sicola et al. column 1, lines 7-11); and forwarding said single data set in accordance with a communication protocol from a first of said plurality of programmable electronic devices to a second of said plurality of programmable electronic devices (See Sicola et al. column 1, lines 7-11, prior art, also see Sicola et al. column 13, lines 1-61, also see Debique et al. column 10, lines 53-67).

As to claim 24, Debique et al. as modified discloses comprising the steps of, detecting a communication link failure in said storage network between said first programmable electronic device and said second programmable electronic device (See Sicola et al. column 10, lines 15-27); and

instructing said second replication facility of said second programmable electronic device to enter said first state to log one or more writes to a second local storage device coupled to said second programmable electronic device (See Debique et al. column 5, lines 4-23, also see Sicola et al. column 14, lines 44-59, also see Sicola et al. column 14, lines 13-34).

***Allowable Subject Matter***

4. Claims 5, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form **including** all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record (Sicola et al. -U.S. Patent No. 6,658,590 B1-and- Debique et al. (U.S. Patent No. 5,613,079) do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim), instructing said first replication facility of said first electronic device to halt logging of said one or more writes to said local storage device upon said determination that said first replica can be updated; and instructing said first replication facility of said first electronic device to initiate generation of said second replica upon said determination that said first replica can be updated, as claimed in claims 5, and 23.

#### ***Response to Arguments***

6. Applicant's arguments filed on April 5, 2005 have been fully considered but they are not persuasive.

In response to applicant's argument on pages 3 and 4 that "Debique patent does not teach or suggest a step of instructing a first data replication facility of a first electronic device in a storage network to replicate data corresponding to one or more writes identified in a log to generate a second replica upon determination by the first electronic device the first replica held by the physically remote storage device can be updated due to a removal of the detected error condition that prevents updating of the first replica held by the physically remote storage devices" is acknowledged but it is not deemed to be persuasive.

The Examiner points to Debique figure 1, and col. 1, lines 30-67, teaches multiple master replication of data thereby, indicating that more than one replica is generated and transmitted to remote targets. The Debique patent has also incorporated by reference co-pending application “replication facility”, Ser. No. 08/181,704 teaching the multiple replication facilities generating copies of data and tracking changes in the original replica set.

The claimed language does not indicate the second replica being generated at any location different from the first device (i.e. host) therefore; it is broadly interpreted to be read on multiple copies of data being generated by the host device. Silica specifically as shown in figure 3, shows (computer) to a remote host (computer) for simplicity reasons each site depicts only one host (computer) per site (col. 8, lines 1-25). However, figures 1 and 2, are more detailed description showing each site having two hosts (computer), in the storage site. Silica 's figures show the mirroring (replication) when a host computer sends back up copy of the data to a remote node. The node can be a single host (computer) or multiple host computers existing at the node (col. 17, lines 24-40).

Although the Examiner has not made a U.S.C. 112nd rejection on the claim language, it is clear by the recitation of “can be” to be vague and indefinite since it does not clearly affirm the steps of claims.

In response to applicant's argument on pages 4, 7, and 8 that “Sicola does not generate a second replica” is acknowledged but it is not deemed to be persuasive.

Sicola disclosed the remote copy set is a pair of same data (mirror data col. 6, lines 51-67), one on the local array and one on the remote array (col. 8, lines 21-38) and because the pair

are the same data, there is no requirement for inclusion of information from the remote location (both pairs on the local and remote array are mirror of each other and no data in any one is different from the other). The contents of the local array is immediately copied to the remote array ready to use as a backup (i.e. a first set of volume data is replicated and the relocate is sent to multiple remote data volumes).

In response to applicant's argument on pages 5 and 6 that "neither Debique nor Sicola, alone or in combination teach or suggest a step instructing each data replication facility of each of the plurality of programmable electronic devices to enter a logging routine should a host device of the data replication facility detect a communication link failure" is acknowledged but it is not deemed to be persuasive.

The Examiner maintains that the combination of Debique with the teachings of Sicola. The Examiner broadly interprets the "each data replication facility" to read on "host device" whether a single host device or a plurality of host devices perform the replication steps.

Debique generally teaches a method consisting in receiving new data into a first replica, reading g status data associated with consistency metrics relative to a second replica, comparing the status data with a predetermined consistency metric bound (i.e. link failure) and determining whether to update replica data usually by receiving a write request and logging (storing the write) in the first replica data store.

Sicola disclosed the remote copy set is a pair of same data (mirror data col. 6, lines 51-67), one on the local array and one on the remote array (col. 8, lines 21-38) and because the pair are the same data, there is no requirement for inclusion of information from the remote location

(both pairs on the local and remote array are mirror of each other and no data in any one is different from the other). The contents of the local array is immediately copies to the remote array ready to use as a backup (i.e. a first set of volume data is replicated and the relocate is sent to multiple remote data volumes).

In response to applicant's argument on pages 7 and 8 that "neither Debique nor Sicola teach or suggest a the generation of a second replica by replicating data corresponding to one or more writes identified in a log" is acknowledged but it is not deemed to be persuasive.

The Examiner points to the combination of Debique with the teachings of Sicola, specifically, Sicola in column 6, lines 1-21 specifically teaches distance mirroring over a data communication link. In column 8, lines 56-67, Sicola teaches the host performs writes to the local volume on the local array which copies the incoming write data to the remote volume on the target array.

### ***Conclusion***

**7. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neveen Abel-Jalil whose telephone number is 571-272-4074. The examiner can normally be reached on 8:30AM-5:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey A. Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Neveen Abel-Jalil  
June 26, 2005

  
**CHARLES RONES**  
**PRIMARY EXAMINER**